Wisconsin Entomological Society Newsletter

Volume 32, Number 2 **June 2005**

NEWS FROM THE UNIVERSITY OF WISCONSIN INSECT DIAGNOSTIC LAB

by Phil Pellitteri

One of the more common problems sent to the lab are insects associated with people and pet food. Nobody likes the idea of insects in our food . I think everybody knows we eat a lot of insects during a lifetime—it is just something we normally do not talk about. But for those of us who like insects, there are some interesting interactions going on.

Most of the "stored product " insects are beetle families we find under the bark of trees, such as Tenebrionidae (Darkling Beetles), Silvanidae (Silvanid Flat Bark Beetles), Curculionidae (Weevils), Cucujids, Ptinidds (Spider Beetles) and a couple of Anobiids. There are also a large number of Dermestids that attack dried plant materials. It has been speculated that many species were exposed to bird nest or animal burrows and developed a seed or nut diet so had little trouble evolving into a pest of stored grains, nuts or other plant materials.

There are well over 100 species involved. Some of the more common critters in food products include Red Flour Beetle (*Tribolium castaneum),* Confused Flour Beetle (*Tribolium confusum*), Sawtoothed Grain Beetle (*Orzaephilus surinamensis*), and Drug Store Beetle (*Stegobium paniceum*). They are long lived as adults (7-14 months), small (most under 5 mm.) and flattened which helps them to squeeze into packaging. A few species are specialized as whole grain feeders, but most will eat anything with a starch base. The carpet beetles can go for months without food and the larvae can molt backwards into a smaller size when times get tough.

The Drug Store Beetle is not as long lived but seems to have a very wide diet and will feed on cigars, dried peppers (no matter how hot), spices, coffee beans, and was often associated with dried herbs in old pharmacies. It is very commonly found now in dried dog food, where you may find small round emergence holes in the dog treats or in the packaging. The holes look like bark beetle emergence holes. This is one of the few species that flies readily and adults are often found at window sills—far away from the infested goods.

A common question is: "Where did the insect come from," as people are looking for a source of the problem . If goods are shipped to other counties, maybe we can prove the source of the contamination. A majority of the species have been transported worldwide and now are found everywhere people are, so it is very rare to find a critter that is exclusive to one geographic area. Flour Beetles were found in the alabaster food jars in tombs in Egypt and I have seen Granary Weevils in archeological digs of native Americans.

By far the most common grain insect is a Pyralid moth, the Indian Meal Moth (*Plodia interpunctella*). There are about a dozen other moths

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In This Issue...

The Wisconsin Entomological Society Newsletter is published three times a year, at irregular intervals. It is provided to encourage and facilitate the exchange of information by the membership, and to keep the members informed of the activities of the organization. Members are strongly encouraged to contribute items for inclusion in the newsletter. Please send all news items, notes, new or interesting insect records, season summaries, and research requests to the editor:

Janice Stiefel, 2125 Grove Road, Bailey's Harbor, WI 54202, (920) 839-9796, e-mail: jstiefel@itol.com

NOTE: Please report any address changes to Les Ferge, 7119 Hubbard Ave., Middleton, WI 53562. e-mail: ferge@chorus.net

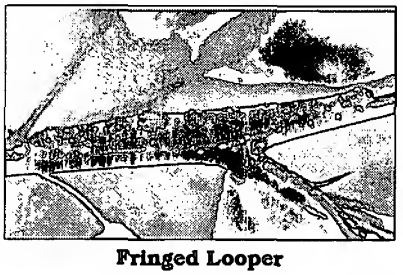
Readers' Answers to March 2005 MYSTERY INSECT

There were only three answers to the Mystery Insect question in the March 2005 issue of WES. Obviously, caterpillars are not one of our strong points. The new caterpillar books described on the right are needed and long overdue.

STEVEN KRAUTH
Madison, Wisconsin
"The mystery insect made me do a little page turning. I believe this is *Campaea perlata* (Lepidioptera: Geometridae) the Fringed Looper."

DEREK BRIDGEHOUSE
Nova Scotia, CANADA
"I am going to go way out on a limb and guess (I'm probably not even close): Common Name: Pale Beauty or Fringed Looper; Scientific Name: *Campaea perlata*."

CHUCK PEARSON
Adrian, Michigan
"The mystery insect in the March newsletter is the Fringed Looper (*Campaea perlata*). The adult moth is called Pale Beauty."



Fringed Looper

Membership Dues for WES

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Please make check payable to WES and send to Les Ferge, 7119 Hubbard Ave. Middleton, WI 53562-3231

CATERPILLAR/LEPIDOPTERA PUBLICATIONS NOW AVAILABLE

Submitted by Phil Pellitteri

A new caterpillar book is about to be published by Princeton University Press...

Caterpillars of Eastern North America:
A Guide to Identification and Natural History
by David L. Wagner
ISBN: 0-691-12144-3—Paper: $29.95
ISBN: 0-691-12143-5—Cloth: $60.00
Order online at: http://www.pupress.princeton.edu/titles/7939.html

FREE PUBLICATIONS (limited availability)
Submitted by WES member, Ron Huber, Minneapolis, MN

The U.S. Forest Service has issued a series of five (thus far) **FREE** publications (paper cover) with colored plates of lepidopterous larvae and adults. For our members who wonder what that strange caterpillar or moth is, these might help:

Caterpillars of Pacific Northwest Forests & Woodlands
FHM-NC-06-95 (Dec 1995). Miller, J. 80pp. 134 color photos.

Caterpillars of Eastern Forests
FHTET-96-34 (Nov 1977). Wagner, D.L., et al. 113pp. 214 color photos.

Macromoths of Northwest Forests and Woodlands
FHTET-98-18 (June 2000). Miller, J.C. & P.C. Hammond. 133pp. 251 color photos (adult moths only).

Geometrid Caterpillars of Northeastern and Appalachian Forests
FHTET-2001-10 (Sept 2001). Wagner, D.L., et al. 239pp, about 200 color photos (moth larvae and associated adults).

Lepidoptera of the Pacific Northwest: Caterpillars and Adults
FHTET-2003-03 (Dec 2003). Miller, J.C. & P.C. Hammond. 324pp. 239 species (larvae and adults) in color, including both moths and butterflies.

Order, using the FHM or FHTET number, from: Elly White, Oregon State University, phone 541-737-7612, or Richard Reardon, U.S.F.S., Morgantown, WV, phone 304-285-1563 (rreardon@fs.fed.us)

Submitted by Bob Patterson of the *Moth Photographers Group* Website.

Caterpillars on the Foliage of Conifers in the Northeastern United States
FHTET-2004-1 Maier, C.T., C.R. Lemmon, J.M. Fengler, D.F. Schweitzer, and R.C. Reardon. 2004., 151 pages. Order from Jane McComb, USDA Forest Service, P.O. Box 640, Concord-Mast Rds., Durham, NH 03824, Phone: 603-868-7693.

Submitted by Chuck Pearson, Adrian, Michigan

Caterpillars in the Field and Garden
A Field Guide to the Butterfly Caterpillars of North America
by Thomas J. Allen, Jim P. Brock and Jeffrey Glassberg.
Oxford University Press, 240 pp. $29.95
http://tinyurl.com/a9vjr

Door County Insect Field Trip

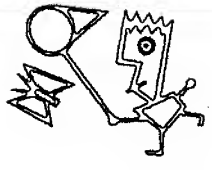
Friday, July 8
9:00 A.M. to
11:30 A.M.

The Door County field trip for 2005 will be held in cooperation with The Ridges Sanctuary's Summer Schedule of Events.

Our focus and search will be on State-owned land, north of Bailey's Harbor. Water-proof footwear is essential. Bring a butterfly net (if you have one), binoculars, and a camera. We will be looking for butterflies, day-flying moths, caterpillars, dragonflies, eggs, pupae, and any insects that present themselves.

For further details and to register, please contact The Ridges at (920) 839-2802. Cost is $10 per person or $15 for a family.

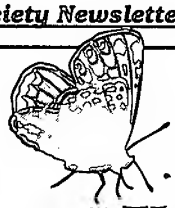
Leader;
Janice Stiefel



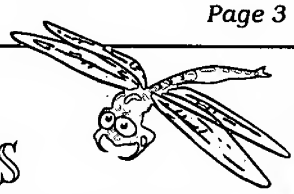
"Happiness is like a butterfly. The more you chase it, the more it will elude you.

But if you turn your attention to other things, it comes softly and sits on your shoulder."

—Author Unknown



SUMMER 2004 INSECT FIELD TRIPS BY THE MADISON AUDUBON SOCIETY



(NOTE: These are not collecting trips.)

DAMSELFLIES and DRAGONFLIES of Rocky Run (West)
Columbia Co. Saturday, June 25, 9:30 A.M. -- 12:00

Damselflies are smaller, more slender, relatives of dragonflies. Many are marked with striking blue patterns. On this joint trip with the Wisconsin Wetlands Association we will travel to the west section of Rocky Run Creek in Columbia County for a 2½ hour morning walk. We will observe dragonflies and damselflies and learn about the identification, biology, behavior, beauty, and life-style of the various species we encounter. Leaders will be Mike Reese and Karl Legler. (Karl has produced a color photographic guide to dragonflies and Mike has a website devoted to butterflies and damselflies of Wisconsin: (wisconsinbutterflies.org). Bring binoculars if you have them (close-focusing ones work best) or just get close! It's best to wear long pants and a hat for protection from the sun. Bring mosquito repellent for the shady areas.

Meet at 9:30 A.M. at the west side Rocky Run Creek parking lot. From Madison go north on Highway 51. Nearly 4 miles north of Poynette turn right onto Morse Road and go east for about ¾ mile. There is a small parking lot on the north side of the road. Call Karl Legler at (608) 643-4926 (Sauk City) or email karlndot@chorus.net only if you have a question about the trip or the weather (trip will not go in rain).

MADISON BUTTERFLY COUNT, Dane County
Saturday, July 2, 9:00 A.M. -- 12:00

Our 15th annual count! Each summer butterfly enthusiasts all over North America participate in a census of butterfly species. Each count is conducted at several sites within a 15 mile diameter circle and the same circle is surveyed each year. These censuses help to monitor the health of our butterfly populations and the results of nearly 500 North American counts are published in an annual report. If you can identify butterflies, or can help spot butterflies, or just want to see and learn about butterflies, join us on this count. Observe with eye or close-focusing binoculars. Dress for protection from the heat and sun; a hat is recommended. The North American Butterfly Association requires a $3.00 fee from each participant to cover publishing costs.

Meet at the parking lot at the **Grady Tract** in the UW Arboretum at **9:00 A.M.** We will count until about noon. **Directions**: In Madison, from the intersection of the Beltline and Midvale Boulevard go north on Midvale Blvd. Immediately turn right onto Nakoma Road and immediately right again on Mohawk Drive. Follow the road to its intersection with Seminole "Highway". Turn right on Seminole and drive south across the overpass to the corner parking lot for the Grady Tract. Call the leader, Karl Legler, at (608) 643-4926 only if you have a question about the butterfly count.

BUTTERFLIES OF WALKING IRON, Dane County
Saturday, July 9, 9:30 -- 11:30 A.M.

Butterfly enthusiasts Karl and Dorothy Legler will lead this two hour morning hike at Walking Iron County Park in western Dane Co. We will observe a variety of butterflies as they take nectar from wildflowers and prairie plantings, and learn about their identification, behavior, and lifestyle.

Bring binoculars if you have them (the closer they focus the better) or just get close! It's best to wear long pants and a hat for protection from the sun.

Directions: Meet at west entrance to Walking Iron at 9:30 A.M. (about 20 miles west of Middleton). From Madison drive west on Hwy 14. About 1 mile past Mazomanie turn right (north) on Machokerr Rd. Go ¾ of a mile and turn left (west) on Hudson Road for ¼ mile. Turn right (north) onto Beckman Road. Look for the parking lot on the right. Call Karl only if you have a question about the trip, at (608) 643-4926 (Sauk City).

FRUSTRATION

by Jane Mingarl

I must say I am looking forward to weeding sweet clover out of the park's prairie areas again this June. Only this time I'm thinking of doing it in the manner of Padeen in the movie, *Master & Commander*, garlanded with little containers. This might make my weeding a little more productive, since I wouldn't have to run into the building for a jar every ten minutes. Though I don't know how much weeding I would actually get done with this distraction. On the other hand, some of the things that precipitated dashes for jars—like the poop bugs—were still there when I came back out for them, so there are probably less eccentric options than bug-jar bandoliers.

The poop bugs made my summer, though. Before I met them, I knew that some insects ate poop and some looked like poop, but I had not yet known any that carried it around. Anyway, I was pulling weeds and noticed small flocks of black "bugs" on the undersides of bergamot leaves. They had a tail, which they held out in the air, and it had a black glob on it. I collected a leaf and one bug in a jar.

After two days the critter molted into a very spiky yellow bug. That's when I saw that the tail was a fork, and the black glob could fall off it. My book said this was a Tortoise Beetle larva. I had never seen a Tortoise Beetle. After seven days of eating, the larva pupated, and in seven more days I had a jaunty little brown beetle, reminiscent of a British Colonial pith helmet and rather endearing. *

At that point I was quite a happy person: I had met a new insect and nurtured it from a larva to a beetle. This was about the same time that a friend was sharing all kinds of fascinating things about warning coloration and gregarious insect behavior, as related to the Gorgone Checkerspot Caterpillars on our Sawtooth Sunflower plants. We wondered why these caterpillars could all group together on the tops of leaves without being wiped out by hungry birds. Evidently it's because they're prickly and they taste bad, because they accumulate alkaloids from their food, the sunflower. A bird doesn't need to wipe out a population to find out it's yucky, either: birds that eat one remember the orange and black or red and black colors, and avoid insects of those colors in the future. This also works for several insects that eat milkweed and acquire its cardiac glycosides—they are warning colored.

Physonota unipunctata
Cedar Creek Website

Months later it occurred to my analog brain to wonder why these Tortoise Beetle larvae could hang around gregariously in their "black skin" stage. On leaf undersides they probably are pretty well hidden from birds, but they're such slow-moving things that a hungry predacious bug could finish them off.

Insects with some toxicity or bad taste can "safely" be gregarious. What bad taste could these beetle larvae have? And if they did have a bad taste or toxicity, why were they not wearing warning coloration? Did that only work on birds?

I speculated that carrying poop around presented potential predators with a rather nasty morsel. Perhaps this was anthropomorphic of me, though, because (recall) there are creatures that eat poop. However, the larvae were also toting around their molted old black skins. I researched the bergamot that the larvae were eating. Could these Tortoise Beetle larvae hang out together because something vile from the bergamot was accumulating in their skin and poop?

According to the Agricultural Research Service, bergamot—a very nice plant for human tea and nectarly attractive for long-tongued insects—has at least 13 chemicals (some in large amounts) that specifically repel insects. (But apparently not Tortoise Beetle larvae.)

I had a brainstorm: Warning colors of bad-tasting or stinging insects are orange and BLACK, red and BLACK, yellow and BLACK, or white and BLACK. Could black alone function as a warning color? In my excitement, I searched the Internet...nothing on black alone as a warning color.

Many insects can see colors. Two studies I read seemed to show: (1) that dragonflies are more likely to avoid eating yellow-and-black patterned insects, rather than black insects; while (2) chicks, it seems, also focus on the combination. It appears that a strong pattern of one color and black is "the warning." (Think: skunk.)

I shot the proposal past my friend. She reminded me that plenty of "delicious" insects are black. I pled my case with another friend. He observed that it's hard to tell, sometimes, where the blue begins and the black ends on a toxic Pipevine Swallowtail Butterfly. This gave me slight hope until I found a photo of a Pipevine Swallowtail: ORANGE spots in blue-BLACK.

I found that some studies had been done on Tortoise Beetles and their fecal shield (translation: toted poop), but do you think I can get my hands on a single one of those articles? Argh! So does anyone know how I can attach baby food jars to some kind of belt? It looks like I'm going to need to capture a lot of insects to test these theories.

(On the bright side, an article I found on the Pipevine Swallowtail caterpillars brought up a completely different angle on gregarious behavior: some plants can react to being eaten; and one larva or caterpillar alone may trigger the reaction throughout the leaf or plant, making it less nutritious for other larvae, but many eating together in one place can really pig out before the plant's defense takes effect. As a result, very young gregarious larvae grow faster than older larvae.)

Please see, **CREDITS**, *Page 5*

CREDITS, *from Page 4*

*Phil Pellitteri. identified it as *Physonota unipunctata*.

Agricultural Research Service/Phytochemical & Ethnobotanical Databases http://sun.ars-grin.gov:8080/npgspub/xsql/duke/plantdisp.xsql?taxon=635

"Contrast vs. color in aposematic signals," by Gamberale-Stille, Gabriella, and Tim Guildord. In Animal Behaviour, May 2003, vol. 65, issue 5, p. 1021.

"Why are wasps so intimidating: field experiments on hunting dragonflies (Odonata: *Aeshna grandis*)," by Kauppinen, Juha, and Johanna Mappes. In Animal Behaviour, Sept. 2003, vol. 66, issue 3, p. 505.

"Aposematic coloration," by Allen, J.A., and J.M. Cooper. In Journal of Biological Education, 00219266, Spring '94, v. 28, issue 1.

"Aggregative feeding of Pipevine Swallowtail larvae enhances host-plant suitability," by Fordyce, James A. Oecologia (2003), 135:250-257.

Jane is a member of WES and an assistant naturalist at Ledge View Nature Center, Chilton, WI.

MYSTERY INSECT

Can you identify it?

This is a dark brown aquatic insect about 2 in. long with a wingspan of approximately 4 in. It often comes to electric lights and is found in freshwater ponds and pools. Send answers to the editor. Individuals with the correct answer will be announced in the next issue of the *WES Newsletter*.

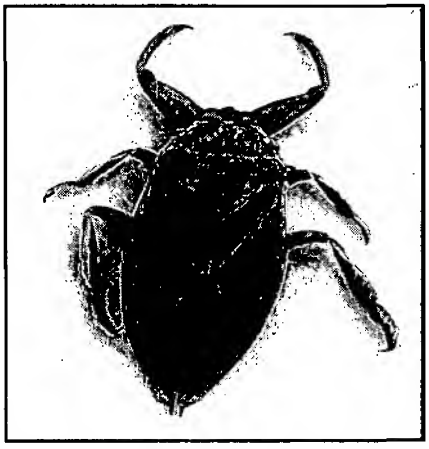


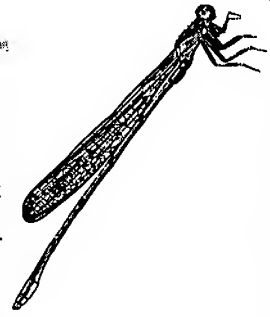
Photo: Janice Stiefel, 6/4/03

House Sparrow: A Damselfly Predator

Dreux J. Watermolen

Male House Sparrow

Female House Sparrow



Several references suggest that birds are probably the main predators of adult Odonata[1, 2, 3, 5]. One researcher[4] catalogs numerous bird species as odonate predators based on the presence of remains in the birds' stomach contents. During the summer of 1995, I witnessed predation on an Eastern Forktail, *Ischnura verticalis* (Say 1839), by a previously unreported avian predator.

While visiting a coffee shop in downtown Madison, I watched a small flock of House Sparrows (*Passer domesticus*) foraging along the curb and sidewalk just outside the shop's window. An adult male Eastern Forktail landed on the windowsill, where it rested for about 45 seconds. As the damselfly began to fly off, one of the House Sparrows oriented towards the damselfly, hovered briefly, and snatched the insect from the air. The bird then settled on the sidewalk a short distance away, where it consumed all but the wings of the damselfly.

Although not previously reported as a predator of this species[4, 5], House Sparrows have been reported as predators of several others, including the Hairy Dragonfly, *Brachytron pratense* (Müller 1764), Blue-tailed Damselfly, *Ischnura elegans* (VanderLinden 1820), and Banded Demoiselles, *Calopteryx splendens* (Harris, 1782), in Great Britain[6, 7].

While the observed behavior is not particularly unusual (most *Ischnura* damselflies are weak flyers[8]), it is probably not common. Of 1,500 House Sparrow stomachs examined in one study[4], only four contained the remains of adult dragonflies. Thus, I am curious to learn if others have made similar observations.

References:

1. Askew, R.R. 1988. *The Dragonflies of Europe*. Harley Books, Colchester.

2. Miller, P.L. 1995. *Dragonflies*. Richmond Publishing Co., Slough, England.

3. Silsby, J. 2001. *Dragonflies of the World*. Smithsonian Institution Press, Washington, DC.

4. Kennedy, C.H. 1950. The relation of American dragonfly-eating birds to their prey. *Ecological Monographs* 20(2):103-142.

5. Corbet, P.S. 1999. *Dragonflies: Behavior and Ecology of Odonata*. Cornell Univ. Press, Ithaca.

6. Attlee, H.G. 1949. House-sparrows feeding on dragonflies. *British Birds* 42(3):85.

7. Hammond, N. 1997. House Sparrows, Chaffinch and Spotted Flycatchers eating damselflies. *British Birds* 90(4):368.

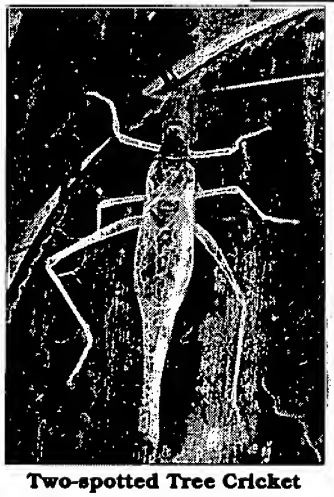
8. Westfall, M.J., Jr. and M.L. May. 1996. *Damselflies of North America*. Scientific Publishers, Gainesville.

Dreux is a member of WES. He is an ecologist interested in the zoogeography, life history, and taxonomy of Wisconsin's rich biological diversity.

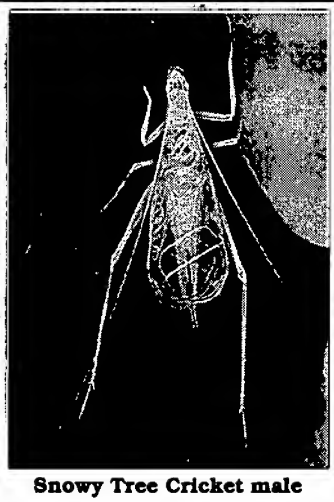
The Care and Feeding of Captive Tree Crickets

by Carroll Rudy

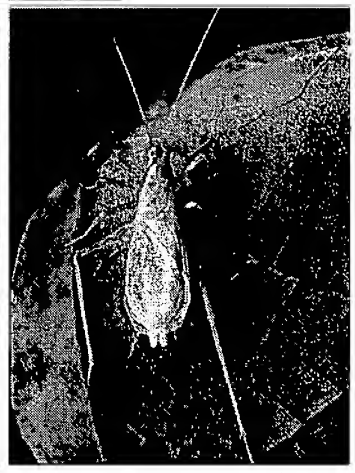
I was interested in reading the remarks about Tree Crickets in the October 2004 issue of the *WES Newsletter* in response to its appearance as the "Mystery Insect," especially the question about whether or not they eat animal material. I first tried to keep them as pets when I was a teenager because I enjoyed their sounds so much. About 20 years ago I started trying again and finally had some success. I read somewhere that they ate aphids, so at first I tried capturing aphids to feed them. This wasn't very practical. I had to keep fresh vegetation in a five gallon aquarium to feed the aphids so the crickets in turn could eat the aphids, and I was not even sure they ate the aphids. I also gave them fresh flowers, because I often observed them on flowers and thought they might be eating nectar or pollen, but I didn't know. When I caught the Tree Crickets in August or September, they lived until the last fresh flowers gave out in October.



Two-spotted Tree Cricket
(*Neoxabea bipunctata*)
Photo: Carroll Rudy



Snowy Tree Cricket male
(*Oecanthus fultoni*)
Photo: Janice Stiefel



Narrow-Winged Tree Cricket
(*Oecanthus niveus*)
Photo: Carroll Rudy

What could I feed them to make them live longer? I surmised that they might be able to eat fresh fruit instead of nectar, and meat instead of aphids, so I started to feed them tiny bits of fruit and raw liver. They eagerly ate both. Soon I had Snowy Tree Crickets living into December, January and even February.

I found that they didn't need much space because they used to find a favorite spot to hide and only emerged to feed. Eventually I found they were quite comfortable in a quart mayonnaise jar covered with nylon mesh, with a sprig of plant to climb on, and on which to put the food, and a piece of paper towel to hide in. I misted the plant once a day so they could get water. They continued to chirp for months until their wings eventually wore out and only a rasping sound was heard.

Feeding them raw fruit and liver was successful but rather messy, a daily necessity, and required frequent cage-cleaning, but obviously it was nutritious enough to keep them alive. I experimented with prepared foods and found that they did equally well with crumbs of tropical fish food and droplets of honey. I have been keeping a few Tree Crickets every year since to enjoy their sounds long after the outdoor ones are dead. I've kept four different species that live in my yard in Calumet County: The Snowy Tree Cricket, Two-spotted Tree Cricket, Narrow-winged Tree Cricket, and the Black-horned Tree Cricket. My identification source was: *The Key to Crickets North of Mexico* at http://buzz.ifas.ufl.edu/cricklist.htm.

According to the range map that accompanies that key, Calumet County is not included in the range of the Narrow-winged Tree Cricket, so the identification may not be correct, but is the only one that fit my crickets' description and sound.

The Snowy Tree Crickets usually lived the longest and, strangely enough, they died in the reverse order of capture—the earlier captured the longer they lived. This may be because early capture reduces exposure to disease and parasites. Of parasites, I have observed one surprising incident. Once while misting a tree cricket's cage, I got the cricket wet, and a horsehair or Gordian worm (Nematomorph) began to emerge from the cricket's body. Gordian worms are usually four to eight inches long, white, round, threadlike worms that breed in water and develop in the bodies of host grasshoppers and crickets after the host insect ingests one or more cysts at the water's edge. If the insect gets wet after the worm matures, it exits the host to find water where it can breed. These Gordian worms are often seen writhing in knotlike formations in puddles or containers where grasshoppers have fallen into the water. Old folklore had it that they were horsehairs come to life in barnyard drinking troughs. Seeing a six-inch worm emerge from the tiny body of a tree cricket was very surprising and gruesome. The cricket soon died. The presence of the worm was even more surprising in a host species that normally spends its life above the ground in shrubbery and trees, for Gordian worms breed in water and grasshoppers are infected by eating cysts at the edge of puddles.

Carroll is a member of WES, former biology teacher, and editor of *Calumet Nature Studies Newsletter*.

INSECTS, *from Page 1*

you could find, but when someone complains of small moths fluttering in the home, or finds worms in their candy bar, it turns out to be *Plodia*. It is very common in bird seed, dried fruit and chocolate (with and without nuts) vegetable seeds, dried flowers

Indian Meal Moth, wingspan ¾ in. (*Plodia interpunctella*)
Photo: Janice Stiefel

and popcorn. It has a six-week life cycle but can take up to a year to develop, depending on food availability and temperature. It has shown resistance to some standard grain treatments. Once it is brought into the home, it is very good at laying eggs outside packaging and the very small larvae crawl inside. They deposit webbing on the food source and larvae will often crawl away from the food to pupate in a protected place. The best defense is to store starch-based products in good containers such as glass jars or plastic containers. Glued cardboard boxes and thin plastic wrap will not keep most of these food pests from invading. It can be quite frustrating trying to hunt down all of the breeding sources, since they do not have to be in the kitchen. Remember the flour paste art from the kids or the walnut nut Christmas wreath?

If we really want to get technical we could mention how some rodent tapeworms use stored grain insects as intermediate host, but overall there are no health risks from being exposed to these insects. That does not stop people from filing law suits. If the critters were found in products that were in the home for more than a few days, it is impossible to rule out the source from being inside the home and not the product.

There are even predators and parasites associated with most of these food pests. Now, I do not want any unwanted guests in my cereal, but for those of us who enjoy insects, it is interesting to think of the whole food web that might be behind your cupboard.

Phil is the District Outreach Specialist at the College of Agriculture & Life Sciences, Dept. of Entomology, UW-Madison. He is often heard answering insect questions on the radio.

BAD BREATH...

Insects Zip Air Holes to Cut Oxygen Risks

by S. Milius

A need to avoid overdosing on that dangerous gas—oxygen—may be what drives some insects to shut down their breathing holes periodically.

That's two researchers' proposal to explain why many ants, grasshoppers, moths, and some other insects on occasion close—for hours at a time—the air holes, or spiracles, that line their bodies. The animals' breathing systems work so efficiently that resting insects have to take care not to overdose on oxygen, contends Timothy Bradley of the University of California, Irvine. Studies of the pupal stage of a moth show that oxygen concentrations stay constant inside internal respiratory tubes, despite external changes in gas concentration, Bradley and Stefan Hetz of the Humboldt University in Berlin report in the Feb. 3 *Nature*. "It's a new idea, and this is the first evidence for it," says Bradley.

Another researcher who has studied the problem, Steven Chown of the University of Stellenbosch in South Africa, calls the new paper "a remarkable piece of work." He points out that lungfish and some amphibians also do stop-and-start breathing. The new paper, he predicts, will inspire a rethinking of the phenomenon.

An insect's spiracles lead to branching trees of internal airways that let in oxygen for fueling metabolism and get rid of carbon dioxide. These airways deliver oxygen some 200,000 times as fast as a mammal's blood vessels do, and they whisk away carbon dioxide some 10,000 times as fast, according to Thorsten Burmester of the University of Mainz in Germany.

The cumulative wear and tear of oxygen exposure has been implicated in tissue deterioration during animals' aging, so Bradley proposed that insects' respiratory shutdowns might minimize such damage. To test that idea, Bradley and Hetz inserted their probes through two of the spiracles into airways of Atlas Moth pupae. As the researchers varied external oxygen concentrations, they found that concentrations inside the airways stayed steady. Internal oxygen concentrations were about one-quarter normal atmospheric concentrations, even when external oxygen was more than double the normal amount.

The traditional explanation for the opening and closing of air holes was that the cycle saves water. A more recent explanation linked on-off spiracles with efficient gas exchange during life underground or in other confined spaces.

Researchers have challenged both explanations as failing to explain the pattern of breathing observed among species and the timing of the cycling.

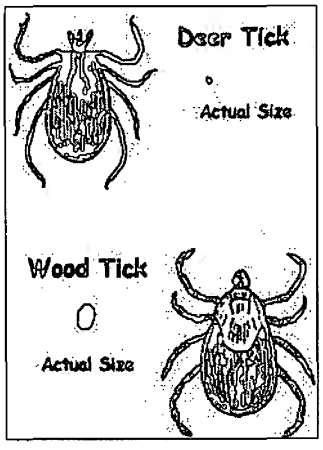
Burmester says, "The major point is that most people think that oxygen is good, but that isn't always the case."

Wisconsin Entomological Society
Janice Stiefel, Editor
2125 Grove Rd.
Bailey's Harbor, WI 54202

Address Correction Requested

DEER TICK AND LYME DISEASE RESEARCH

by Dreux Waterlomen



During the summer of 2004, researchers, funded by the Centers for Disease Control and Prevention, collected ticks at four Wisconsin state park properties: Hartman Creek (near Waupaca), Kohler-Andrae (Sheboygan), and Mirror Lake (Wisconsin Dells) State Parks, and Hoffman Hills State Recreation Area (near Menomonie). Deer ticks and dog ticks were the predominant tick species collected. All life stages of the Deer Tick were found at each site, likely indicating successful establishment of the tick. The researchers were very surprised by the results at Kohler-Andrae since previous research had indicated that Deer Ticks had not established near Lake Michigan. All Deer Tick nymphs were submitted for analysis to detect the causative agent of Lyme disease. Positive nymphs were found in all four parks. The researchers suggest that visitors be aware of the presence of these tick species and take protective measures. Tips for preventing Lyme disease infections, as well as the above sketch are available at the following website:
http://dnr.wi.gov/org/caer/ce/eek/critter/insect/ticked.htm